Nov. 11, 1969 P. D. EMERSON ET AL 3,477,661

WARP YARN CREEL FOR WEAVING

Filed March 20, 1968 2 Sheets-Sheet 1

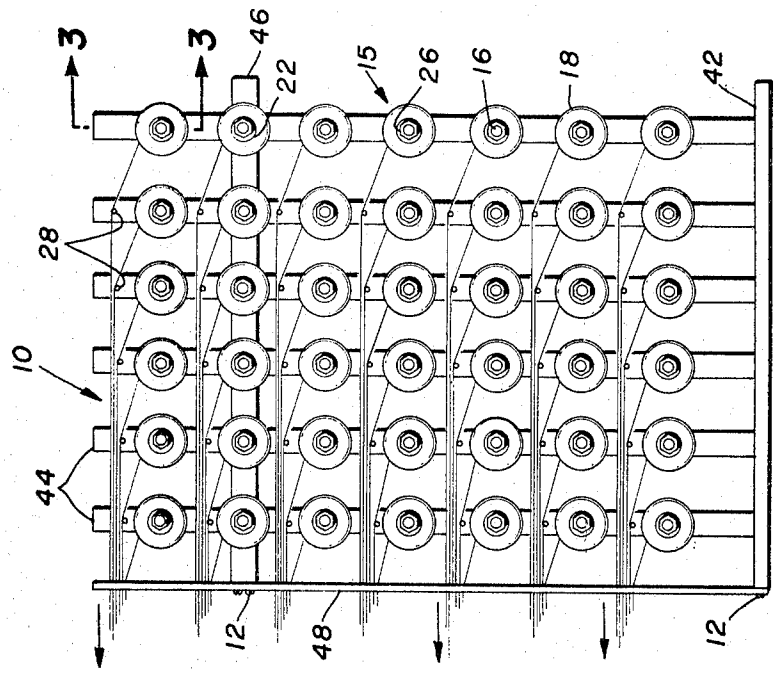


FIG. 2.

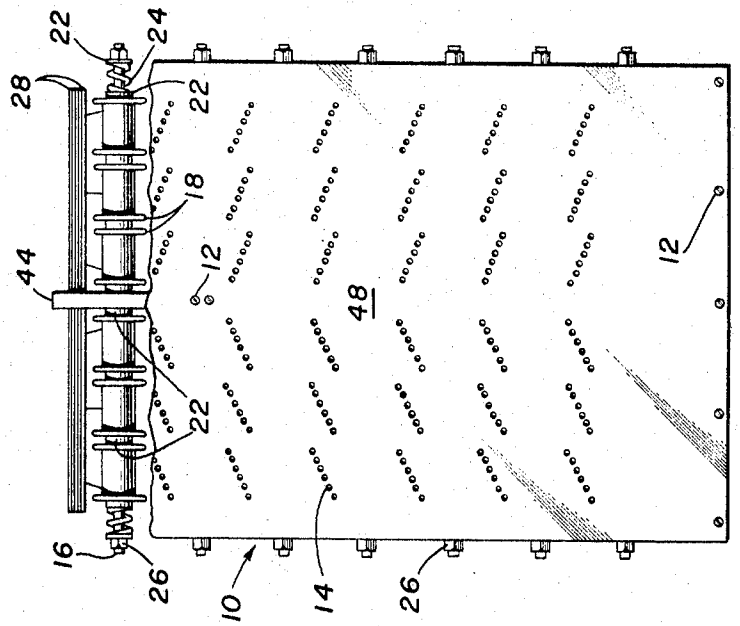


FIG. 1.

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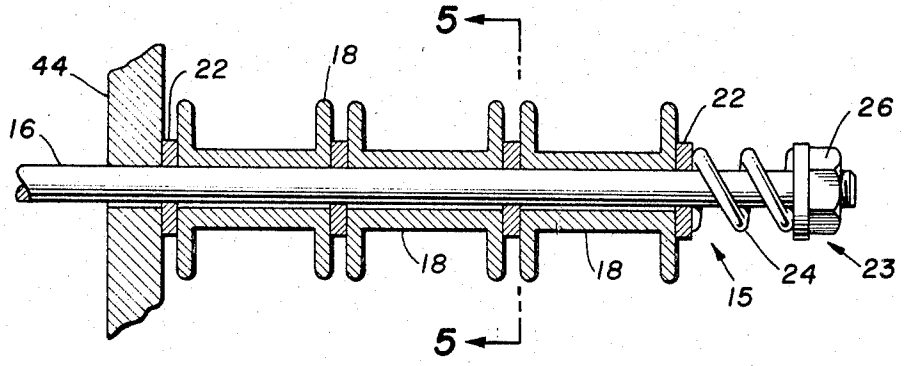


FIG. 3.

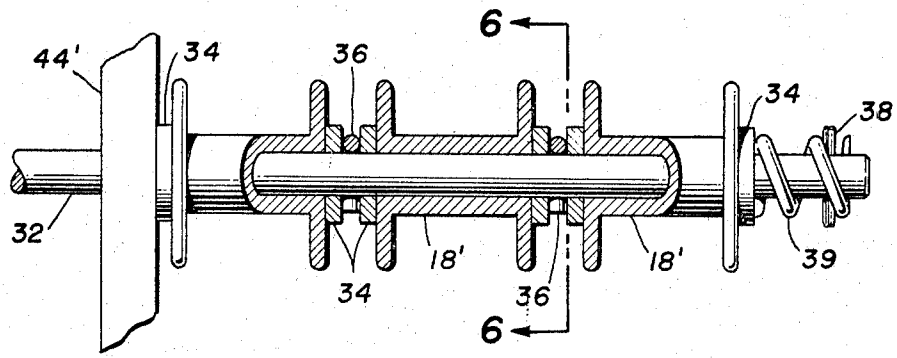


FIG. 4.

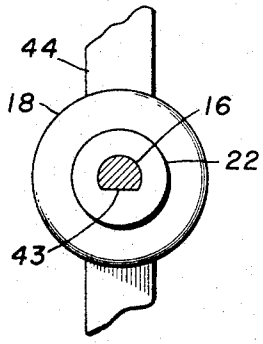


FIG. 5.

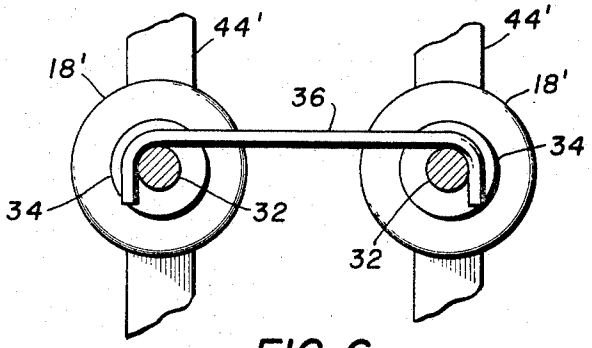


FIG. 6.

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WARP YARN CREEL FOR WEAVING

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U.S. Cl. 242—131 9 Claims

ABSTRACT OF THE DISCLOSURE

A yarn supply creel is comprised of a plurality of bobbin mounting stations each of which support a plurality of yarn bobbins which are adapted for individual rotation and a braking system provided for each of the bobbin mounting stations whereby each yarn emanating from the bobbins of a given station is subjected to substantially the same unwinding tension.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to yarn supply creels and, more specifically, to a creel which is provided with a plurality of bobbin mounting stations wherein each of the bobbin mounting stations is provided with a plurality of bobbins, the bobbins being separated from each other by a spacer means which prevents the rotative motion of one bobbin from being transmitted to an adjacent bobbin.

Description of the prior art

The weaving of conventional fabrics requires a multiplicity of individual yarns called warp yarns which are woven into the fabric in the machine direction. The warp yarns are generally supplied to the weaving loom by means of a warp yarn beam.

Some fabric constructions, i.e., Axminster, Wilton and Velvet rugs, require that either some or all of the warp yarns be supplied from an individual warp yarn spool or bobbin mounted on a frame structure called a yarn creel. Conventional creels are so constructed that a single spool or bobbin is mounted at each position or station to facilitate the changing and replenishment of depleted bobbins. Thus, the size of the yarn creel is dependent upon the number of warp yarn ends which must be supplied to the loom.

Creel warp yarns have been previously employed in the weaving of special fabrics, the construction of which is such that all of the warp yarns are not woven into the fabric at the same rate. For example, in the weaving of a loop pile rug, some of the warp yarns form the loop pile while the remaining warp yarns form the ground or base fabric structure. With the advent of three-dimensional fabrics which utilize stuffer and locker warp yarns to provide dimensional stability to the fabrics, individually creeled warp yarns are expeditiously employed to supply the loom since the rate at which the stuffer and locker warp yarns are woven into the fabric vary considerably. While beamed warp yarns may be used to weave such fabrics, auxiliary equipment is needed to compensate for the difference in weaving rates of the beamed warp yarns.

The physical properties of the yarn to be woven may necessitate the supplying of the warp yarn by means other than a warp yarn beam since the beaming of a plurality of warp yarns does not always provide for a uniform lay of the yarns upon the beam. Synthetic organic fibers normally have sufficient extensibility and low modulus such that the beamed warp yarns do not impair the subsequent weaving process. However, the weaving of fabrics consisting of synthetic inorganic fibers having a high modulus and a low to negligible extensibility, such as, glass, quartz and metal yarns, necessitates the utilization of a separate supply source for each of the warp yarns of the fabric. Thus, the creel of this invention finds special utility where a warp beam cannot be efficiently utilized.

SUMMARY OF INVENTION

The yarn creel of this invention is comprised of a plurality of yarn bobbin mounting stations. Each mounting station is adapted to support for rotation at least two bobbins which reside thereon in a side-by-side relationship and which are free to rotate individually. The yarn bobbins rotatably mounted on each creel station are subjected to a common braking force which is exerted thereon by an axially aligned compression spring. Each bobbin of the mounting station is adapted for individual rotation by means of a bobbin spacer. The spacer while being movable in the axial direction with respect to the mounting station is prevented from a rotational movement so that the common braking force exerted on the bobbins mounted on a single mounting station is transmitted from bobbin-to-bobbin axially while the torque of one bobbin is prevented from being transmitted to an adjacent bobbin. Thus, the yarns being withdrawn from the bobbins of a common mounting station are subjected to substantially the same tension while the yarns withdrawn from different mounting stations may be subjected to different tensions.

Therefore, an object of this invention is to provide a yarn creel with a plurality of bobbin mounting stations wherein each mounting station of the creel is adapted to receive a plurality of yarn bobbins.

Another object of this invention is to provide a common bobbin braking means for each of the bobbins mounting stations whereby the various bobbins mounted on a single mounting station are subjected to substantially the same braking force so that the yarns withdrawn from those bbobins are subjected to substantially the same tension.

Yet another object of this invention is to provide a bobbin separator means between adjacent bobbins so that the bobbins common to a single mounting station are rotatably isolated from each other to provide for the withdrawing of yarn from a plurality of bobbins common to a single mounting station at preselectedly different rates.

A still further object of this invention is to provide a compact yarn creel which is adapted to supply a maximum number of yarns from a minimum volume of space.

These and other objects of this invention will become apparent when the following detailed description is read in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a front, partial cut-away view of the yarn creel showing the bobbins mounted on the yarn mounting statoins;

FIGURE 2 is a side view of the yarn creel showing a plurality of bobbin mounting stations and the yarn guide means associated therewith;

FIGURE 3 is a partial section view taken along the line 3—3 of FIGURE 2 showing a first embodiment of the bobbin spacer means and the braking means;

FIGURE 4 is a partial section view showing a second embodiment of the bobbin spacer means and the braking means;

FIGURE 5 is a partial section view taken along the line 5—5 of FIGURE 3 showing the geometrical configuration of the first embodiment; and

FIGURE 6 is a partial section view taken along the line 6—6 of FIGURE 4 showing the geometrical configuration of the second embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGURES 1, 2, 3 and 5 relate to the first embodiment of this invention. Yarn creel **10** is comprised of a base **42**, a plurality of vertically disposed bobbin mounting stations **44** and a horizontally arranged support spacer **46**, all of which being integrally welded together with support spacer **46** maintaining the vertical alignment of bobbin mounting stations **44**. Additional bracing may be provided but is not shown. A yarn separator panel **48** is connected to base **42** and support spacer **46** by means of screws **12**. Yarn separator panel **48** is provided with a plurality of openings **14**, one of which is provided for each yarn so as to maintain separation between the yarns during withdrawal of the yarns from the various bobbins. While the yarn separator panel as shown may be preferred, it is contemplated that other separating devices may be advantageously employed, such as, a coarse mesh wire screen or a plurality of reeds.

Bobbin mounting station **15** includes a rod **16** which is either mounted onto or extends through vertical support **44** and which is secured to vertical support **44** by any convenient means so as to be cantilevered therefrom. As shown in FIGURE 3, rod **16** is of a length to accommodate three bobbins **18**; however, it is contemplated that rod **16** may be of any length which is sufficient to accommodate at least two bobbins. As shown in FIGURE 3 with rods **16** extending through vertical support **44**, rod **16** provides for three bobbin stations.

Bobbins **18** are slidably and rotatably mounted on rod **16** and are separated from each other and from vertical support **44** by means of spacers **22**. As shown in FIGURE 5, rod **16** provided with a machined flat surface **43** which mates with a matching flat in the bore of spacers **22** such that the spacers **22** and rod **16** maintain a fixed position so as to prevent the transmission of rotary motion between the adjacently and rotatably mounted bobbins of the bobbin mounting station.

Braking means **23** includes a compression spring **24** and a nut **26** which is threadably mounted on the end of rod **16**. Compression spring **24** is separated from the outside bobbin **18** by means of a spacer **22** and acts against nut **26** to force bobbins **18** against vertical support **44**. The braking force exerted on bobbins **18** may be varied by rotating nut **26** in a clockwise or counterclockwise direction whereupon the braking force is increased or decreased, respectively. While the bobbins included in a single bobbin mounting station are subjected to substantially the same braking force, it can be seen that the braking force exerted upon other bobbins of other bobbin mounting stations may be substantially different and can conform to the dictates of the weaving process.

Yarn guides **28** are provided to maintain a separation among the yarns during the withdrawal of the yarns from the bobbins and are mounted on veritcal supports **44** in a manner similar to the mounting of rod **16**. While the yarn guides **28** are depicted as rods, it is contemplated that any conventional yarn guide, such as, a plurality of pigtail guides could be used.

The second embodiment of this invention for preventing the transmission of motion between commonly mounted bobbins including a modified bobbin braking means is shown in FIGURES 4 and 6. In this embodiment, a cylindrical shaft **32** is securely mounted in vertical support **44'**. Shaft **32** is provided wih a pair of washers **34**, which are rotatably mounted thereon, for each bobbin **18'**. An elongated wire spacer **36** which extends to an adjacent shaft **32** is positioned between the washers **34** of each bobbin **18'** so that while the washers are free to rotate, the rotative motion is not transmitted between the washers of two adjacent bobbins. As shown in FIGURE 6, wire spacer **36** is constructed to span the distance as represented by the separation between two adjacent bobbin mounting stations and is placed in position by slipping the wire spacer **36** over shaft **34**. Thus, a single wire spacer **36** prevents the transmission of motion between pairs of commonly mounted spools of two distinct bobbin mounting stations.

The bobbin braking means is comprised of a pin **38** which extends through the exposed end of shaft **32** in a manner being perpendicular to the axis thereof. Compression spring **39** is helically shaped so that pin **38** extends through one convolution thereof to adapt it to be screwed on the end of shaft **32** and exert a compressive force against bobbins **18'**. The braking force imposed upon the bobbins which are common to the bobbin mounting station is adjusted by rotating spring **39** about shaft **32**.

It is contemplated that the yarn which is mounted on bobbins **18'** may be withdrawn therefrom in the manner as described in accordance with the first embodiment.

It will be apparent to those skilled in the art that various changes and modifications may be made herein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A warp yarn creel for supplying a plurality of warp yarns to a weaving machine comprising:

(a) a frame having a base and a support member mounted on and extending vertically upwardly from said base; and

(b) a plurality of bobbin mounting stations spaced along said support member, said bobbin mounting stations each comprising a rod member rigidly connected to said support member, at least two bobbins mounted for rotation on said rod member with each bobbin having wound thereon a length of yarn, braking means adapted to exert a common braking force on said bobbins and bobbin spaced means mounted on said rod member between adjacent bobbins and adapted to isolate the rotational motion of each bobbin whereby the withdrawal of yarn from a selected bobbin produces a rotation only in that bobbin.

2. The creel of claim **1** wherein said support member has extending outwardly therefrom a plurality of yarn guides, said yarn guides located to support each of said yarns upon their withdrawal from their respective bobbins in a position away from the remainder of said bobbins.

3. The creel of claim **2** wherein said frame is provided with a yarn spacer, said yarn spacer adapted to receive said yarns from said yarn guides and to present said yarns to said weaving machine in an ordered manner.

4. The creel of claim **3** wherein said bobbing spacer means is a washer adapted for axial movement along the length of said rod member while being prevented from rotating about said rod member.

5. The creel of claim **4** wherein said rod member is provided with a flat surface extending parallel to the axis of said rod member and said washer being provided with a concentric opening being shaped to conform with said flat surface whereby said washer is adapted to slide axially along said rod member and is prevented from rotating about said rod member.

6. The creel of claim **5** wherein said braking means is comprised of a helically shaped compression spring being mounted on said rod member in axial alignment therewith and a nut threadably mounted on the end of said shaft, said nut acting against said compression spring to create a braking force on said bobbins and by a selective rotation thereof is adapted to adjust said braking force exerted on said bobbins.

7. The creel of claim **3** wherein said frame is provided with a plurality of support members and wherein said bobbin mounting stations of each support member are in horizontal alignment with similarly positioned bobbin mounting stations of the other support members.

8. The creel of claim 7 wherein said bobbin spacer means is an elongated wire extending between two horizontally aligned bobbin mounting stations and having ends adapted to be received by the rod members of said bobbin mounting stations between adjacent bobbins to prevent the transmission of a rotative motion from a selected bobbin to an adjacent bobbin.

9. The creel of claim 8 wherein said braking means is comprised of a pin rigidly mounted on the exposed end of said rod member perpendicularly thereto and a helically shaped compression spring mounted on said rod member in axial alignment therewith, said pin extending through a spring convolution to position said spring

against an adjacent bobbin whereby said spring is adapted to exert a braking force on said bobbins and is adapted by a selective rotation thereof to adjust said braking force exerted on said bobbins.

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